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NEWS RELEASE

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Address by
James E. Webb, Administrator
National Aeronautics and Space Administration
before the
GENERAL FEDERATION OF WOMEN'S CLUBS
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I am grateful for this opportunity to appear before you today to discuss the program of space research and exploration in which our Nation is now so extensively engaged. A broad public understanding of this effort is essential if we are to achieve our objectives, and benefit to the fullest extent from the scientific and technological knowledge which it will produce.

I have had sufficient exposure to women's organizations, both as a businessman and as a Government official, to appreciate what an effective force you can be in support of any worthwhile human endeavor. I would hope, therefore, that my remarks here today will add to your knowledge of the United States space activity. I would hope, also, that through you, some of this information may find its way to the members of the federated clubs in your home communities, and through them, to their friends and families -- particularly to their children.

First, let me speak to you briefly about the reasons which underlie our national decision to embark upon an accelerated program of scientific research and exploration in space.

In his book, "The Strategy of Peace," written before he took office, President Kennedy expressed his convictions regarding the United States role in space. He wrote:

"In relation to the world outside, our democracy must demonstrate...that it has the energy and the sense of adventure -- as well as the technical skill -- to play a role of leadership in the exploration of space."

Then, turning to the capacity of the American people to meet such a challenge, he continued:

"The American, by nature, is optimistic. He is experimental, an inventor and a builder who builds best when called upon to build greatly Arouse his will to believe in himself, give him a great goal to believe in, and he will create the means to reach it. This trait of the American character is our greatest single national asset."

One of the President's early acts, after his inauguration, was to translate these thoughts into action. He associated closely with him, as Chairman of the National Aeronautics and Space Council, the Vice President, who had served as Chairman of the Senate Committee on Aeronautical and Space Sciences. The President asked and received approval from the Congress for an accelerated space program which would rapidly advance our science and technology, looking toward enabling an exploratory team to land on the moon and return safely within this decade.

One of the difficulties which we experience in outlining our objectives in space is that of achieving an appropriate understanding of the basic scientific knowledge which space exploration will yield. Many citizens who have had no training and no particular interest in science, find it difficult to associate fundamental knowledge with the practical applications which flow from it.

John Glenn, in his appearance before Congress, related a story which serves well to illustrate our need for learning all we can about the basic forces of nature.

He told of Disraeli, the 19th century prime minister of England, who once visited the laboratory of the great scientist, Faraday, where he was conducting his early experiments with electricity.

"But what possible use is it?" Disraeli asked.

Faraday, repeating a reply Ben Franklin once made to the same question, answered:

"What use is a baby?"

We know now the value of electricity, just as our children and their children will some day appreciate and benefit from the value of other basic knowledge which our space research will produce For this is our first and most fundamental purpose. We have begun the exploration of space -- and so far it is only a beginning -- to increase man's fund of scientific knowledge.

We are sending robot spacecraft and astronaut-explorers into space to learn more about the earth and the sun, about the history of the solar system, and about the structure and dynamics of the universe We shall take full advantage of our fast growing capabilities in space exploration to answer many questions, from the effects of the sun's radiation on the chemistry of the upper atmosphere, to the dangers of cosmic radiation for space travelers, and to the existence of life on other planets.

Answers to age-old questions which we expect to get from the extension of scientific inquiry and experimentation further into space in this decade alone will certainly stir's men's imaginations as they have never been stirred before and may well have profound impact on the destiny of mankind.

We seek to give our Nation the ability to sail on "this new ocean" of space, as President Kennedy has called it, and to achieve a position second to none in space capabilities. This means forcing rapid advances in space technology. It means developing the rocket engines, spacecraft, and ground support and worldwide tracking facilities which will enable us to dispatch men and instruments into space at will and on a routine basis. What is spectacular in space today must be made the commonplace of tomorrow.

Our ability to venture beyond the earth's atmosphere has been made possible by the development of the rocket engine, which is not dependent upon the oxygen of the air for combustion, but carries its own oxygen supply with it into space. Today, we have a whole family of rocket boosters in the National Launch Vehicle Program, some developed by NASA and others the responsibility of the Department of Defense. All ten vehicles, however, are or will be available to any agency of the Government having work to do in space.

These launch vehicles range in size from the Scout, which can put a 150-pound payload into earth orbit at a relatively moderate cost, to the mighty Nova, which will be able to put a payload of 175 tons into earth orbit, or send 50 tons of payload off toward Mars or Venus.

The National Launch Vehicle Program will also help us to increase the reliability of our rockets. By utilizing a limited number of rockets, and improving their reliability as the space program advances, we can save time, money, effort, and lives. NASA's Delta rocket, for example, now has the phenomenal record of nine straight successes. Only one -- the first one launched -- has failed.

These vehicles are used to launch satellites into orbit and to send probes into space. As our skills have improved, spacecraft have progressed from primitive single-purpose devices to highly complex and long-lived satellites carrying numerous devices which make measurements and collect data to advance our knowledge of the universe and enlarge the role of man himself in space science and exploration.

The most familiar of these are the spacecraft which have carried our astronauts into orbit around the earth. Special applications satellites are devoted to research and development in the fields of meteorology, communications, and navigation, forecasting, global communications, and aid to navigation Scientific satellites, which are really automated laboratories in space, carry instruments to study the earth from above, investigate near space, the sun, the planets, and the stars In each instance, the goal of their quest is new knowledge which will benefit mankind

We are, as you know, an aeronautics as well as a space agency, and we have under way a vigorous program of aeronautical

research and development, including the well known and highly successful X-15 flights. Just last week the X-15 plane piloted by Bob White reached the record height, for an airplane of more than 47 miles. We are also working to improve the performance of the helicopter and of airplanes that can take off and land vertically or on very short runways. We are working on a supersonic transport, designed to fly three times the speed of sound, and to match the present jet transports for economy, and seek to open the way to such vehicles of the future as hypersonic transports, to fly at five times the speed of sound, recoverable boosters for spacecraft, and orbital vehicles that can land under more complete pilot control.

We are working on practical applications of space technology to improve man's life on earth In cooperation with other agencies, we are developing the capacity to put earth satellites to work in the fields of weather forecasting and global communications, and as aids to navigation

We are also seeking to identify advances in aeronautical and space technology -- such as new inventions, new materials, new manufacturing processes, and new management approaches -- which can be used to advantage in our economy, in solving pressing national problems, and in raising our standard of living.

We also have the very important objective of developing a national space technology and capability so strong and vigorous that the Department of Defense and other agencies can assure that space will never be used as an avenue of aggression against us, and that space will always be used for peaceful purposes for the benefit of all mankind

Some of the most significant events of the present century will take place in space or will stem from space endeavors. Our advances into space, and the new technology which makes these advances possible, will affect our daily lives, our educational system, our economy, our international capacity for leadership, and our national security in many ways, some of which we cannot at present foresee

The National Aeronautics and Space Administration is a research and development agency. Our job is to provide the ideas, the research, and the engineering for continuous advance in the air and in space

Emphasis on scientific and technological pioneering is a major characteristic of the age in which we live. Both industry and the Federal Government are devoting much greater resources to research and development than ever before. We must do this to maintain our position of scientific and economic leadership in the world, and to assure that the standard of living of our rapidly growing and now predominantly urban population continues to rise.

This is a fact to which we must all adjust. Government must take the lead where necessary, as in the creation of the Atomic Energy Commission and the National Aeronautics and Space Administration. School boards and university presidents must adjust to the growing demand for more and better trained scientists and engineers, and a broad education in science for all our people. Young people who are choosing their future vocations, and parents and other grown-ups who advise them, must have a clearer view of the opportunities which science and engineering careers offer, and the demands which they make.

Although manned space flight is but one aspect of our overall national space program, the widespread publicity given this activity has caused it to become the focal point of interest in our space effort on the part of millions of persons, here and abroad.

Our astronauts' achievements in space have been a source of pride and inspiration to Americans of all ages. Since the orbital flight of Col Glenn on February 20, tens of thousands have written to him, to the President, and to me, commenting on the pleasure our space successes have given them.

We have heard from children so young that their mothers had to write their letters for them, and from mothers so old that a discernible tremor influenced their pens.

Picture, if you will, Mrs. Louise Agler, of the community of Van Wert, in John Glenn's home state of Ohio. Mrs. Agler is 90 years old. Her eyesight and hearing have failed to the extent that she can neither hear nor see the television set.

This fine lady followed every minute of Col. Glenn's flight, her daughter shouting progress reports into her ear in order that she might share the experience with him. When

the astronaut had safely returned to earth, she wrote a poem -- one of thousands written by people all over the country on that day -- which was published in her local newspaper.

I won't quote all of it, but here is one verse which expresses what millions of others felt:

"Our hearts united, our prayers did blend--
To guide him to his journey's end.
With heart on heart and prayer on prayer
We shoved that rocket through the air "

Nothing I could say would add to that.

That the spirit of adventure flows strongly in the hearts and minds of young Americans is evident from the thousands of letters which we receive from boys and girls desiring to become astronauts Apparently no age is too young to experience this urge, for many five- and six-year-old children have volunteered.

It might interest you, too, to know that we hear from as many girls as boys. Each of them is provided with a summary of astronaut qualifications, and given guidance on the sort of experience and education which will be required if they are ever to achieve their ambition to become astronauts.

With the typical impatience of youth, however, most of them don't want to wait until they grow up to make the trip. They want to go right now "I want to be the first boy (or girl) on the moon, "is the refrain which runs through most of their letters.

One of my favorite communications -- which I enjoyed because it seemed so typical of the youthful American spirit, came from a young man named Tom Wicklein, who lives in Elgin, Illinois.

Tom wrote that he and his friend Matt Fisher wanted to be "part of the crew that is going to land on the moon in 1971," at which time both boys would be 18 years old.

"We will both take any training there is to be done," Tom wrote. "Must we prove we have guts?" he asked. "We just did today

"Matt and I did something brave. I laid down at the bottom of a hill and my best friend Matt rode over me. I think that took a lot of courage on Matt's part but he thought the opposit (sic)."

I wrote Tom and told him that astronauts certainly need courage, but that I didn't think he and Matt needed to go to such great lengths to prove they had it I suggested that they concentrate on getting a sound education, instead.

Tom's letter created quite a stir around the office because everyone was curious to know what Matt ran over him with. Some of our more sensitive and imaginative secretaries had visions of a little boy with tire tracks on his T-shirt.

The mystery was solved when an Associated Press reporter went out to Tom's home and talked to him. He discovered that Tom had stretched out at the bottom of a hill and Matt ran over him with his sled. We were all relieved to learn that he hadn't used a Mack truck.

Another stirring example of this youthful American spirit came from Sister Mary Ellen, a teacher at Melrose Academy, near Philadelphia. Her fifth grade class had been discussing myths, and she challenged each of the pupils to compose a myth of his own.

One of them, written by a pupil named Paul Pettinato, she sent to her local newspaper with these comments:

"The enclosed is the work of a little boy who departed somewhat from the typical style of a myth to produce what I consider an excellent example of the rugged pioneer spirit, still living in the heart of a 20th century, ten-year-old American child. Yes, Young America is laughing and playing, but Young America is learning, too."

This is what Paul Pettinato wrote:

"A Myth"

"About five years ago, Premier Khrushchev sent two men to the moon He gave them a sign to put there so the rest of the world would know that Russia was there first. When the two

Russians landed on the moon they spoke to Khrushchev by radio. He asked them what they saw on the moon. They said they saw nothing but white mountains and a little sign.

"They said it read two million miles to Cape Canaveral "

I relate these stories not merely as isolated bits of humor or pathos associated with the space program but as evidence of what I hope and believe is a significant by-product of our national space effort -- a renewed and revitalized national spirit

To a nation somewhat shaken and concerned with Soviet space successes, John Glenn's flight brought a renewed feeling of confidence in our American institutions, and in our ability to get a job done.

Moreover, to a people somewhat shy and reluctant about exhibiting national pride, his appearance before Congress gave simple patriotism a renewed respectability. Many eyes were wet when, speaking with what Life magazine called "unabashed, star-spangled sincerity," this rugged American astronaut said:

"I still get a real hard-to-define feeling down inside when the flag goes by."

This experience has been good for the United States, and it has been good for America's image before the rest of the world But most important, i has been good for the young people on whom our Nation must rely as it goes on to conquer the new frontiers which lie before us.

The space program has given young boys and girls throughout the land new heroes and a dramatic new frontier with which to identify.

Instead of emulating the cowboy heroes of a long-gone era in which they can never participate, children can visualize themselves as the John Glenns or the Scott Carpenters of the future. Certainly their television exposure to the manned orbital flights is more useful in building character and establishing personal goals than watching hour after hour of barroom brawls and gunfights

This identification with something useful and productive is something which will benefit our children and our country, particularly if youthful admiration can be related not merely to a group of daring pilots, but also to the team of highly trained and educated technicians, scientists, and engineers of which they are a part.

In a sense, the dramatic aspects of space flight have climaxed a long effort to elevate the public concept of the scientist and the engineer to the status he deserves as one who is contributing mightily to our progress as a nation. I am hopeful that this will encourage more young people to enter scientific and engineering fields.

A serious challenge that the over-all space program will have to meet in the years ahead is getting enough well-trained scientists and engineers, particularly engineers

President Kennedy has underlined the seriousness of this problem At a press conference earlier this year, the President said: "One of the most critical problems facing this Nation is the inadequacy of the supply of scientific and technical manpower to satisfy the expanding requirements of this country's research and development efforts in the near future."

The Engineers Joint Council has reported a decline in engineering enrollments in our colleges and universities in recent years just when they should be going up, not down

The downward trend in freshman enrollment in engineering began in 1958,
In 1957, about 11 percent of all college freshmen enrolled in engineering In 1961, the percentage was down from 11 to less than seven.

In other words, the number of engineering students has been declining while the number of all college students is going up This has serious implications for the long run success of our space program, and for our national security.

Many of the most difficult problems to be overcome in landing on the moon and learning to sail with facility on the new ocean of space are problems which can be solved only by engineers -- by highly trained, brilliant and creative engineers Much of the work done by NASA, and even more of the

work done by industry under contract to NASA, must be performed by engineers.

For that matter, progress not only in space but on all other industrial and technological fronts in this modern age requires the skills and brains of engineers.

You may be familiar with the recent study made by Nicholas DeWitt of Harvard University for the National Science Foundation. He points out that while we are producing about 90,000 graduates in engineering, science, and applied science each year, the number in the Soviet Union is 190,000, or more than twice as many. During the decade of the Sixties, the Soviet Union is expected to train about three times as many professional engineers and scientists as we do, if present trends continue.

We have a great deal to do in this country to build up rapidly the educational facilities and the teaching staffs needed to increase our output of scientists and engineers. At the same time, we must make a special effort to interest young men and young women in preparing themselves for scientific and engineering careers

I would be remiss if I concluded my remarks here today without commenting on the role which women are playing in the space program.

Charles Dickens once commented about the enthusiasm and tenacity of "roused women," a trait of the feminine character which has been clearly discernible through the desire of many women that we launch a female astronaut. We haven't enlisted any women astronauts, as you know, and have no plans to do so in the immediate future, for reasons which I shall explain in a moment. I hasten to assure you, however, that this does not constitute a prejudicial attitude on the part of those of us who are administering the space program.

We really are convinced that women are here to stay, and that they have an important place in our Nation's space activity. In fact, a poem by Kate Field comes to mind which, perhaps describes our attitude:

"They talk about a woman's sphere as
though it had a limit:
There's not a place in earth or heaven,
There's not a task to mankind given,
There's not a life, or death, or birth,
That has a feather's weight of worth
Without a woman in it."

Women are playing an important role in the United States space program, and one which we hope will increase as this national effort accelerates

As stated previously, no women have yet been trained by NASA as astronauts, nor is it likely that any will be selected for this type of service in the immediate future. To gain the utmost from the limited number of flights which we can make in the early stages of the program, it is essential that each astronaut be able to contribute the maximum to the program.

For this reason, we require that, in addition to the most extensive obtainable experience as jet aircraft test and research pilots, each astronaut also possesses extensive education, training, and experience in one or more scientific and engineering fields Under conditions as they exist in aviation at the present time, these qualifications are more readily met by men than by women In fact, they are most apt to be met by men trained in the military services where the extensive flight experience can be obtained.

However, many women are already employed by NASA in numerous non-flight capacities. Not only are about one-fourth of NASA employees women, but in many instances they occupy scientific and technical positions of importance.

Dr Nancy Roman is Chief of Astronomy in the NASA Office of Space Sciences and has responsibility for such important projects as the Orbiting Solar Observatory, which was successfully flown, and the Orbiting Astronomical Observatory, which is now under development.

These orbiting observatories, of extremely high value in the field of astronomy, have almost unbelievable pointing accuracy

The Astronomical Observatory, when it is orbited sometime in 1964, will be able to point its instruments at whatever region of the sky the observers on the ground select, and to move from star to star on command.

The first Astronomical Observatory will be programmed to record the brightness in ultraviolet light of some 100,000 stars. This mapping of the heavens in ultraviolet light is something which the finest observatories on earth cannot do, because very little ultraviolet light filters through the earth's atmosphere. The second Orbiting Astronomical Observatory will carry a 36-inch telescope aloft to make photometric studies of selected stars.

You will appreciate, I am sure, that Dr. Roman -- the woman scientist in charge of these programs -- finds them a challenging and exciting responsibility. They are only a part of her activity, however. Recently, Dr. Roman described a typical week in her office, and I would like to recount a few of the highlights to you, in her words:

"My week opened with a TV interview on the briefing which Dr. Jocelyn Gill and I had given the Mercury astronauts a few days before, describing the stars they could expect to see, and telling them of the observations we would like to have them make for astronomy. Then, after several hours of work on my budget, I attended a briefing at the Department of Defense.

"I spent Tuesday in New York at a meeting with about 75 astronomers, geophysicists, and physicists on the origin of the solar system. I reviewed with several of the Europeans attending this meeting possible additions to our space astronomy program and their possible participation in that program.

"On Wednesday I met with a group of girls at Goucher College and talked to them about the possibilities of a career in astronomy, and in the afternoon talked with Dr. Strong, of Johns Hopkins University, about infrared studies of the sun and planets which he is making from balloons.

"On Thursday I spent the day in a plant north of Baltimore reviewing their work on equipment which they are making for the NASA astronomy program.

"Friday proved to be an exceedingly hectic day, with visits from astronomers from Texas and Arizona, a long conference with a representative of the Space Science Board of the National Academy of Sciences, a visit from a physicist at the Marsnall Space Flight Center in Huntsville, Alabama, and a review of our project to fly a 36-inch telescope in one of our Orbiting Astronomical Observatories."

I am sure you will agree that these highlights from the work week of one of our women scientists illustrate that a career in science can be tremendously interesting as well as an important contribution to the country. Incidentally, Dr. Roman's work during this particular week also illustrates the effort we make in NASA to keep in closest touch with the academic and scientific communities of the Nation and the world.

Eleanor C. Pressly, a section head at the Goddard Space Flight Center, is one of NASA's leading experts on sounding rockets. Harriet Malitson, a solar physicist at Goddard, is now doing important work on the development of ways to predict solar storms, and Marjorie Townsend, an electronics engineer at the same center, has made important contributions to the infrared measurement instrumentation of the TIROS and Nimbus weather satellites.

Ann Bailey, one of our younger scientists, made important contributions to the recent investigation that revealed the earth is not round, after all, but slightly pear-shaped. Another young lady at the Jet Propulsion Laboratory of the California Institute of Technology, Marcia Neugebauer, was coordinating scientist on two of our Ranger flights aimed at the moon.

These are but a few of the women already engaged in space activity at important levels of responsibility. We have, at NASA, a total of 146 women who are classified as professional Aero-Space Technologists and another 77 women who are professional mathematicians.

One of the answers to the shortage of engineers which we face may well be to get more talented young women to enter this field Twenty-six percent of the engineers in Russia, I am told, are women. In this country, only about one percent are women

Too many people think of engineers as road or dam builders working with heavy construction machinery under difficult conditions. That is not a representative picture in this age when so much of our daily life depends on technology and engineering advances. In fact, most of the engineering work done in our agency is performed at desks in air-conditioned offices. The requirement is brains and skill, not brawn.

Young women who have the interest and ability to go into careers in science and engineering will find many opportunities open to them in the Space Age which is just beginning to dawn. And they will also have the satisfaction of serving their country in fields of vital importance to our survival as a free and prosperous Nation. I hope that members of this audience and the influential organizations which you represent will do all you can to see that the young men and young women of this country, when choosing a career, give careful consideration to the scientific and engineering fields where so many of the finest minds the oncoming generations have to offer are so badly needed.

Maintaining leadership in this age of science and technology will challenge the imagination, the ingenuity, the skill, and the courage of every American. As President Kennedy said in 1959:

"The hard, tough question for the next decade...is whether any free society -- with its freedom of choice, its breadth of opportunity, its range of alternatives -- can meet the single-minded advance of the Communist system.

"Can a nation organized and governed such as ours endure? That is the real question. Have we the nerve and the will? Can we carry through in an age where we will witness not only new break-throughs in weapons of destruction -- but also a race for mastery of the sky and the rain, the ocean and the tides, the far side of space and the inside of men's minds?"

The loyal, dedicated, hard-working men and women -- in and out of Government -- who are engaged in carrying out our Nation's space program are answering those questions today.

The answer is, "Yes."

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